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Lie jets and symmetries of prolongations of geometric objects

Shurygin V.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The Lie jet Lθλ of a field of geometric objects λ on a smooth manifold M with respect to a field θ of Weil A-velocities is a generalization of the Lie derivative Lvλ of a field λ with respect to a vector field v. In this paper, Lie jets Lθλ are applied to the study of A-smooth diffeomorphisms on a Weil bundle TAM of a smooth manifold M, which are symmetries of prolongations of geometric objects from M to TAM. It is shown that vanishing of a Lie jet Lθλ is a necessary and sufficient condition for the prolongation λA of a field of geometric objects λ to be invariant with respect to the transformation of the Weil bundle TAM induced by the field θ. The case of symmetries of prolongations of fields of geometric objects to the second-order tangent bundle T2M are considered in more detail.

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